Assessment Highlights
Grade 6 Mathematics
2007

and

A Released Achievement Test

ATA LIBRARY
[redacted]

AE-CUR
ASS

Alberta
Education

ATA LIBRARY
11010 - 142 Street NW
Edmonton, AB
T5N 2R1

This document contains both an assessment highlights report on the 2007 Grade 6 Mathematics Achievement Test and a release of test items from the 2006 achievement test.

The assessment highlights report provides information about the test overall, test blueprints, and student performance on the Achievement Test that was administered in 2007. Also provided is commentary on areas of student performance in terms of strengths and challenges demonstrated on specific outcomes (from the 2007 achievement test). This information is intended for teachers and is best used in conjunction with the multi-year and detailed school reports that are available to schools via the extranet. Beginning in 2007, **Assessment Highlights reports** for all achievement test subjects and grades (except grades 3, 6, and 9 Français/French Language Arts and grade 9 Knowledge and Employability courses) will be **mailed** to school administrators **every year** in the fall.

The released items include the 30 questions from Part A, and 46 multiple-choice questions from Part B that appeared on the 2006 Grade 6 Mathematics Achievement Test. These released items are available only in print form because of copyright limitations. Also included are a test blueprint and an answer key that includes the difficulty, reporting category, test section, and item description for each test item. These materials, along with the Program of Studies and Subject Bulletin, provide information that can be used to inform instructional practice.

Released items from previously secured tests have been made available to teachers in print form. Print versions of released items, which contained approximately 25% of the total number of test items from previously secured tests, were mailed to school administrators each fall from 2004 to 2006.

Every second year, beginning in the fall of 2007, **a test** for all achievement test subjects and grades (except grades 6 and 9 Social Studies; grades 3, 6, 9 Français/French Language Arts; and grade 9 Knowledge and Employability course) will be **mailed** to school administrators as an attachment to the assessment highlights report for that year. In this way, teachers will receive complete forms of achievement tests.

For further information, contact Kelly Rota, Grades 6 and 9 Mathematics Examination Manager, at Kelly.Rota@gov.ab.ca, Dominick Gallo, Grades 6 & 9 Mathematics Examiner, at Dom.Gallo@gov.ab.ca, or Jo-Anne Hug, Director, Achievement Testing, at Jo-Anne.Hug@gov.ab.ca at Learner Assessment, or call (780) 427-0010. To call toll-free from outside Edmonton, dial 310-0000.

The Alberta Education Internet address is www.education.gov.ab.ca.

Copyright 2007, the Crown in Right of Alberta, as represented by the Minister of Education, Alberta Education, Learner Assessment, 44 Capital Boulevard, 10044 108 Street NW, Edmonton, Alberta
T5J 5E6, and its licensors. All rights reserved.

Special permission is granted to **Alberta educators only** to reproduce, for educational purposes and on a non-profit basis, parts of this document that do **not** contain excerpted material.

Excerpted material in this document **shall not** be reproduced without the written permission of the original publisher (see credits, where applicable).

Contents

The 2007 Grade 6 Mathematics Achievement Test 1

2007 Test Blueprint and Student Achievement 2

2007 Mathematics 6 PAT Student Performance Commentary 3

Achievement Testing Program Support Documents 8

2006 Test Blueprint and Item Descriptions 9

2006 Achievement Test 15

The 2007 Grade 6 Mathematics Achievement Test

This report provides teachers, school administrators, and the public with an overview of the performance of those students who wrote the 2007 Grade 6 Mathematics Achievement Test. It complements the detailed school and jurisdiction reports.

How Many Students Wrote the Test?

A total of 37,698 students wrote the 2007 Grade 6 Mathematics Achievement Test.

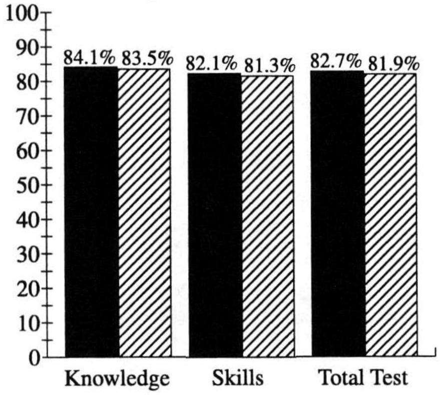
What Was the Test Like?

The 2007 Grade 6 Mathematics Achievement Test consisted of two parts. Part A: *Number Operations and Number Sense,* consisted of 30 multiple-choice questions designed to assess the knowledge students have of number sense. Part B: *Multiple Choice,* consisted of 50 multiple-choice questions based on content from the four strands: Number; Patterns and Relations; Shape and Space; and Statistics and Probability.

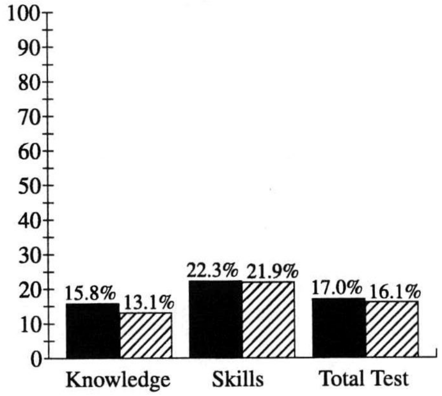
How Well Did Students Do?

The percentages of students meeting the *acceptable standard* and the *standard of excellence* in 2007 compared with 2006 are shown in the graphs below. The results presented in this report are based on scores achieved by all students who wrote the test except those in French Immersion and Francophone programs; results for these students are reported separately. Out of a total score of 54 on the test, (– 4 marks from Part A, and 50 marks from Part B), the provincial average was 34.8/54 (64.4%). Detailed provincial assessment results are provided in school and jurisdiction reports.

Percentage of Students Meeting the *Acceptable Standard* (%)



Percentage of Students Meeting the *Standard of Excellence* (%)



■ 2006 Achievement Standards: The percentage of students in the province who met the *acceptable standard* and the *standard of excellence* on the 2006 Grade 6 Mathematics Achievement Test (based on those who wrote).

▨ 2007 Achievement Standards: The percentage of students in the province who met the *acceptable standard* and the *standard of excellence* on the 2007 Grade 6 Mathematics Achievement Test (based on those who wrote).

2007 Test Blueprint and Student Achievement

In 2007, 81.9% of students who wrote the test achieved the *acceptable standard* on the Grade 6 Mathematics Achievement Test, and 16.1% of students who wrote achieved the *standard of excellence.* These results are slightly lower than results from 2006, in which 82.7% achieved the *acceptable standard* and 17.0% achieved the *standard of excellence.*

Student achievement on the 2007 Grade 6 Mathematics Achievement Test averaged 34.8 out of a total score of 54 (64.4%).

The blueprint below shows the reporting categories and test sections (curricular content areas) by which 2007 summary data are reported to schools and school authorities, and the provincial average of student achievement by both raw score and percentage.

Test Sections	**Reporting Category**		**Provincial Student Achievement Average Raw Score and Percentage**
	Knowledge	**Skills**	
	Recall facts, concepts, procedures, and terminology	Apply facts, concepts, procedures, terminology, and relationships to solve problems in a variety of situations	
Part A: Operations and Number Sense			**3.2/4** **(80.0%)**
Part B: (See four categories below)			
Number • Number Concepts • Number Operations			**10.8/17** **(63.5%)**
Patterns and Relations • Patterns • Variables and Equations • Relations and Functions			**8.2/13** **(63.1%)**
Shape and Space • Measurement • 3-D Objects and 2-D Shapes • Transformations			**7.3/12** **(60.8%)**
Statistics and Probability • Data Analysis • Chance and Uncertainty			**5.4/8** **(67.5%)**
Provincial Student Achievement Average Raw Score and Percentage For Students Who Wrote the Test	**14.5/21** **(69.0%)**	**20.3/33** **(61.5%)**	**Total Test** **34.8/54** **(64.4%)**

2007 Mathematics 6 PAT Student Performance Commentary

The following table provides a brief synopsis of student performance demonstrated on the 2007 Grade 6 Mathematics Achievement Test. The observations have been categorized in terms of student performance strengths and challenges in relation to outcomes that were tested in each of the four strands from the Alberta Program of Studies for K–9 Mathematics. Following the brief synopsis, four items have also been provided as examples to illustrate a few of the observations listed in the table below.

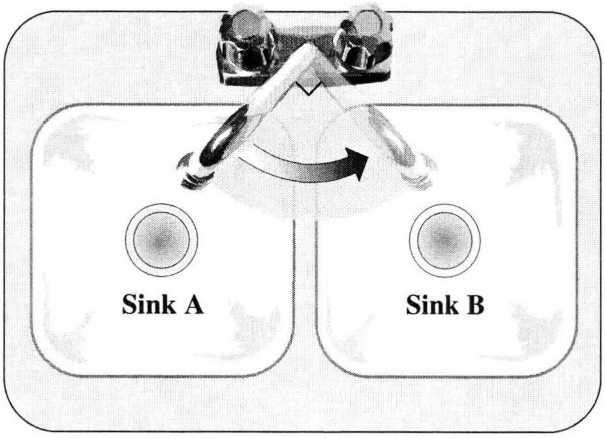
Strand	Outcome Strengths	Outcome Challenges
Number	▪ Solving a problem involving integers by extending counting numbers to less than zero ▪ Solving problems that involve arithmetic operations on decimals to the thousandths ▪ Solving problems involving common fractions ▪ Estimating the solution to calculations involving whole numbers and decimals	▪ Demonstrate number sense of common fractions by estimating the fractional value of a whole number ▪ Solving problems using multi-step calculations involving whole numbers and decimals
Patterns and Relations	▪ Determining a relationship to verify a prediction ▪ Demonstrating the preservation of equality by balancing objects represented in a model/diagram	▪ Creating expressions and rules to describe, complete, and extend patterns and relationships ▪ Using pre-algebra strategies to solve equations with one unknown and with whole number coefficients and solutions
Shape and Space	▪ Recognizing angles as being more than 90 degrees, equal to 90 degrees, less than 90 degrees, equal to 180 degrees, greater than 180 degrees ▪ Classifying angles as acute, right, obtuse, straight, or reflex ▪ Determining the volume of an object by measuring the displacement of a liquid by that object ▪ Demonstrating that many rectangles are possible for a given perimeter or a given area	▪ Converting among commonly used SI units of length, mass, and capacity to solve problems ▪ Determining the ordered pairs of a shape after it is reflected in the first quadrant ▪ Developing and applying rules or expressions for the area of rectangles ▪ Determining the surface area of a right rectangular prism without using a formula
Statistics and Probability	▪ Reading and interpreting graphs that are provided ▪ Analyzing sets of data to make comparisons ▪ Calculating the theoretical probability using numbers between 0 and 1	▪ Selecting an appropriate sample or population to be used in a survey

The following two items, which appeared on both the 2006 and 2007 Grade 6 Mathematics PATs, are examples of performance strengths on two specific outcomes. Information about the relative strength of student performance from one year to the next is also given in terms of whether or not the difference was statistically significant.

Question 1:

Use the following information to answer the question below.

A waterspout moves from sink A to sink B, as shown below.



The movement of the waterspout from sink A to sink B represents a

A. 180° counter-clockwise turn

B. 90° counter-clockwise turn

C. 180° clockwise turn

D. 90° clockwise turn

Statistical Data:

Year of Administration	Mean	2006 vs. 2007 Performance
2006	79.0	Statistically significant decrease
2007	77.8	

In a statistical analysis of this item's performance, a decrease of 1.2% in performance was observed in the 2007 results compared with the 2006 results. The 95% confidence interval for this decrease was 0.6% to 1.8%.

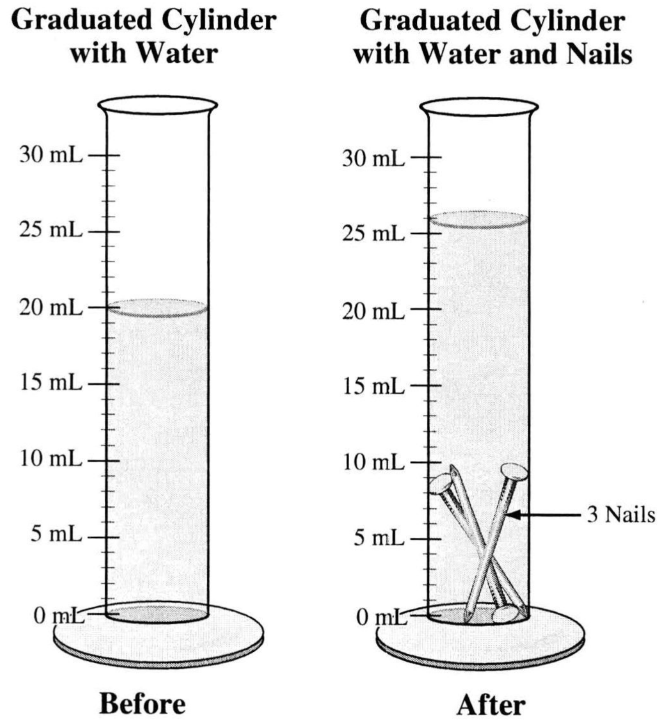
Outcome competency:

The majority of students clearly understood the difference between the two angles given, as well as the correct direction of the rotation. Over 12% of students chose D as the correct answer, indicating some confusion in regard to clockwise versus counter-clockwise rotations.

Question 2:

Use the following information to answer the question below.

The volume of an object can be determined using water displacement.



The volume of 1 nail is

A. 26 cm^3
B. 18 cm^3
C. 6 cm^3
D. 2 cm^3

Statistical Data:

Year of Administration	Mean	2006 vs. 2007 Performance
2006	74.0	Statistically significant decrease
2007	71.9	

In a statistical analysis of this item's performance, a decrease of 2.1% in performance was observed in the 2007 results compared with the 2006 results. The 95% confidence interval for this decrease was 1.5% to 2.7%.

Outcome competency:
A majority of students were successful at applying their knowledge of displacement to determine the volume of each nail. Over 15% of students chose C as the correct answer, indicating that they did not have difficulty determining the volume of all three nails, but simply neglected to determine the volume of one nail.

The remaining two items, which also appeared on the 2006 and 2007 Grade 6 Mathematics PATs, are examples of performance challenges on two specific outcomes. While student performance may have increased in one year to the next, performance is still relatively low in comparison to overall test performance. Information about the relative strength of student performance from one year to the next is also given in terms of whether or not the difference was statistically significant.

Question 3:

The Boomtown town council wants to determine if the citizens want a new soccer field. To obtain an unbiased sample of citizens, the town council should

A. survey players on a Boomtown soccer team
B. interview coaches from Boomtown sports teams
C. place a questionnaire in the local Boomtown newspaper
D. conduct a random telephone survey of Boomtown residents

Statistical Data:

Year of Administration	Mean	2006 vs. 2007 Performance
2006	47.1	Statistically significant decrease
2007	43.2	

In a statistical analysis of this item's performance, a decrease of 3.9% in performance was observed in the 2007 results compared with the 2006 results. The 95% confidence interval for this decrease was 3.2% to 4.6%.

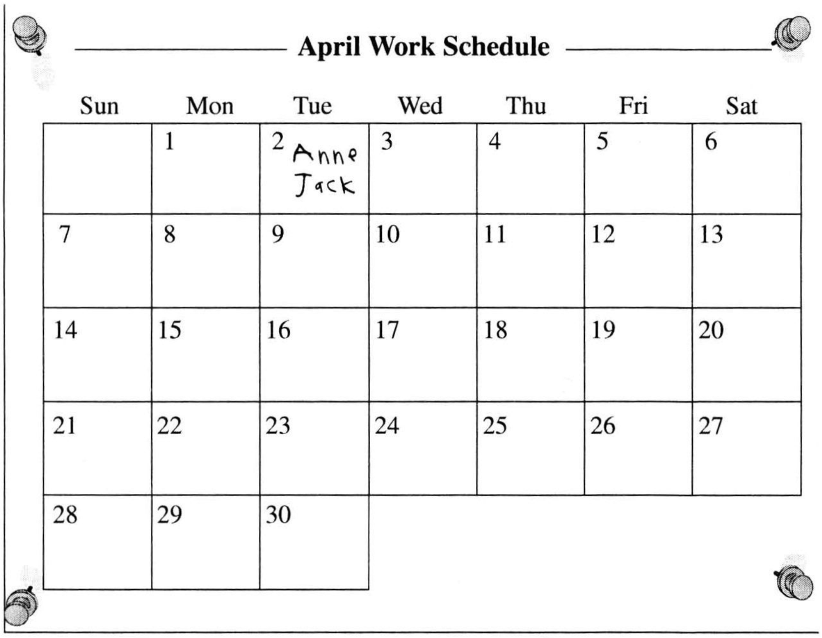
Outcome competency:

Students answering this question correctly were able to select an appropriate method of collecting data to minimize bias. Over 17% chose A as the correct answer, which clearly suggests that these students did not understand the difference between a biased and an unbiased method of data collection. Over 30% chose C as the correct answer, which suggests that these students did have some understanding of biased versus unbiased methods of data collection; however, these students were unable to make the connection between a survey that is randomly administered and a survey that is made up of an unknown sample.

Question 4:

Use the following information to answer the question below.

The science centre is open every day in April. Anne and Jack are tour guides at the science centre. Anne works every second day. Jack works every third day.



April Work Schedule

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2 Anne Jack	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

If Anne and Jack both start work on April 2, then how many more days will Anne work than Jack in the month of April?

A. 3
B. 4
C. 5
D. 6

Statistical Data:

Year of Administration	Mean	2006 vs. 2007 Performance
2006	53.1	Statistically insignificant decrease
2007	52.5	

In a statistical analysis of this item's performance, a decrease of 0.6% in performance was observed in the 2007 results compared with the 2006 results. The 95% confidence interval for this decrease was -0.11% to 1.3%.

Outcome competency:

Students answering this question correctly were able to summarize the given relationship and extend the pattern in order to determine a future event. Student responses to the remaining three choices were more or less split, with 12% choosing A, 19% B, and 16% C.

Achievement Testing Program Support Documents

The Alberta Education web site contains several documents that provide valuable information about various aspects of the Achievement Testing Program. To access these documents, go to the Alberta Education web site at www.education.gov.ab.ca. On the home page, click on "Kindergarten to Grade 12," scroll down and click on "Provincial Testing," and then click on the link for "Achievement Tests." On the "Achievement Tests" web page, you can access the following documents:

Achievement Testing Program General Information Bulletin

The General Information Bulletin reflects a compilation of several documents produced by Alberta Education and is intended to provide superintendents, principals, and teachers with easy access to information about all aspects of the achievement testing program. Sections in the bulletin contain information pertaining to schedules and significant dates; security and test rules; test administration and directives; test accommodations; field testing; resources and web documents; calculator and computer policies; test marking and results; samples, forms, and letters; and Learner Assessment contacts.

Subject Bulletins

At the beginning of each school year, Subject Bulletins are posted on the Alberta Education web site for all achievement testing subjects for grades 3, 6, and 9. Each bulletin provides descriptions of assessment standards, test design and blueprinting, and (for grades 3, 6, and 9 English Language Arts) scoring guides as well as suggestions for preparing students to write the tests and information about how teachers can participate in test development activities.

Writing Samples

For achievement tests in grades 3, 6, and 9 English Language Arts, writing samples have been designed to be used by teachers and students to enhance students' writing and to assess this writing relative to the standards inherent in the scoring guides for the *Part A: Writing* achievement tests. The writing samples documents contain sample responses with scoring rationales, student self-assessment checklists, and scoring categories and criteria for the writing assignments.

Previous Achievement Tests and Answer Keys

All January achievement tests (parts A and B) for Grade 9 semestered students are secured and must be returned to Alberta Education. All May/June achievement tests are secured except for Part A of grades 3, 6, and 9 English Language Arts. Unused or extra copies of only these Part A tests may be kept at the school after administration. Teachers may use the released achievement tests and answer keys for 1998, 1999, 2000, and 2001 that are posted on the Alberta Education web site as well as the print versions of Released Items that are mailed to schools in the fall of each year.

Parent Guides

Each school year, print versions of the Parent Guide to Provincial Achievement Testing for grades 3, 6, and 9 are mailed to schools and posted on the Alberta Education web site. Each guide presents answers to frequently asked questions about the achievement testing program, descriptions and sample questions for each achievement testing subject, and excerpts from the Curriculum Handbook for Parents identifying what students should know and be able to do in each subject by the end of grades 3, 6, and 9.

Involvement of Teachers

Teachers of grades 3, 6, and 9 are encouraged to take part in a variety of activities related to the achievement testing program. These activities include item development, test validation, field testing, and marking. In addition, regional consortia can make arrangements for teacher in-service workshops on topics such as Interpreting Achievement Test Results to Improve Student Learning.

2006 Test Blueprint and Item Descriptions

The following blueprint shows the reporting categories and test sections (curricular content areas) by which questions were classified on the 2006 Grade 6 Part A Mathematics Achievement Test.

Mathematical Process	Question Distribution by Reporting Category	Number and Proportion of Questions
Addition/Subtraction	1, 4, 5, 14, 19, 22, 26	**7 Questions (23% of Total Test)**
Multiplication/Division	3, 6, 7, 13, 15, 18, 23	**7 Questions (23% of Total Test)**
Number Relationships	2, 8, 10, 17, 20, 25, 27, 30	**8 Questions (27% of Total Test)**
Connecting Experiences	9, 11, 12, 16, 21, 24, 28, 29	**8 Questions (27% of Total Test)**
		Total Test 30 Questions (100%)

The table below provides additional information about each question that appeared on the 2006 Grade 6 Part A Mathematics Achievement Test.

Question	Key	Diff. %	Mathematical Process
1	A	89.6	Addition/Subtraction
2	B	56.9	Number Relations
3	D	89.1	Multiplication/Division
4	C	81.4	Addition/Subtraction
5	D	91.4	Addition/Subtraction
6	A	93.8	Multiplication/Division
7	B	72.0	Multiplication/Division
8	D	59.3	Number Relations
9	D	61.2	Connecting Experience
10	A	76.2	Number Relations
11	C	80.7	Connecting Experience
12	B	89.0	Connecting Experience
13	B	77.6	Multiplication/Division
14	C	86.5	Addition/Subtraction

Question	Key	Diff. %	Mathematical Process
15	C	87.9	Multiplication/Division
16	B	94.0	Connecting Experience
17	C	64.6	Number Relations
18	B	89.9	Multiplication/Division
19	D	84.7	Addition/Subtraction
20	C	57.2	Number Relations
21	B	91.4	Connecting Experience
22	A	68.1	Addition/Subtraction
23	A	69.9	Multiplication/Division
24	A	58.2	Connecting Experience
25	D	53.6	Number Relations
26	D	75.0	Addition/Subtraction
27	C	72.0	Number Relations
28	D	79.6	Connecting Experience
29	C	79.9	Connecting Experience
30	C	75.6	Number Relations

The following table provides information on 46* of the test items that appeared on the 2006 Grade 6 Part B Mathematics Achievement Test.

Test Sections (Curricular Content Areas)	**Reporting Category**		**Number and Proportion of Released Questions**
	Knowledge	**Skills**	
	Recall facts, concepts, procedures, and terminology	Apply facts, concepts, procedures, terminology, and relationships to solve problems in a variety of situations	
Number • Number Concepts • Number Operations	16, 26, 28, 32, 40, 47	4, 6, 8, 14, 17, 30, 35	**13** **(28.3%)**
Patterns and Relations • Patterns • Variables and Equations • Relations and Functions	7, 18, 23	5, 12, 15, 22, 24, 31, 33, 34, 44	**12** **(26.1%)**
Shape and Space • Measurement • 3-D Objects and 2-D Shapes • Transformations	10, 11, 25, 37	9, 19, 20, 27, 36, 38, 39, 41, 42, 43	**14** **(30.4%)**
Statistics and Probability • Data Analysis • Chance and Uncertainty	29, 49, 50	1, 2, 3, 21	**7** **(15.2%)**
Number and Proportion of Questions	**16** **(34.8%)**	**30** **(65.2%)**	**46** **(92% of Total Test)**

*Please Note: Four items have not been released from the 2006 test.

The table below provides additional information about 46 of the 50 items that appeared on the 2006 Grade 6 Part B Mathematics Achievement Test.

Question	Key	Diff. %	Reporting Category	Curricular Content Area (Concept)	Item Description
1	A	88.8	S	SP	Find and use information presented in a bar graph to make a calculation
2	D	72.3	S	SP	Compare groups of data in a bar graph to make a conclusion
3	D	47.1	S	SP	Determine which sample group would respond to a survey question with the least amount of bias
4	A	73.1	S	N	Estimate the total cost to solve a problem by multiplying three numbers
5	C	53.1	S	PR	Extend two number patterns to determine the frequency of two events
6	D	71.4	S	N	Demonstrate number sense of common fractions by estimating the fractional value of a whole number
7	C	53.5	K	PR	Determine which expression represents the expected frequency of a future event based on information in a graph
8	A	55.9	S	N	Convert units of length before dividing whole numbers
9	D	49.0	S	SS	Recognize an optical illusion
10	B	79.0	K	SS	Recognize an angle less than 180 degrees, and determine which transformation performed on a straight line could create the angle
11	D	74.0	K	SS	Use the concept of displacement to determine the volume of an object
12	A	79.6	S	PR	Identify the object needed to balance a scale
14	B	59.4	S	N	Solve a multi-step money problem involving multiplication and subtraction of whole numbers and decimals
15	A	69.5	S	PR	Predict when a certain air temperature will be reached when an initial temperature changes according to a certain pattern
16	D	60.1	K	N	Apply equivalent ratios to solve a problem, given a picture of a rectangle with its dimensions labeled
17	D	60.5	S	N	Interpret a diagram to solve a problem using multiplication
18	B	63.4	K	PR	Read and interpret a broken-line graph to draw a conclusion involving two variables
19	C	61.0	S	SS	Find the area of a rectangle when the width and twice the height are given
20	C	69.9	S	SS	Determine the dimensions of a rectangle, given the perimeter and area
21	A	58.5	S	SP	Determine the probability of an event and select an equivalent fraction to express the answer

Question	Key	Diff. %	Reporting Category	Curricular Content Area (Concept)	Item Description
22	C	47.9	S	PR	Determine a pattern presented in a table to predict a future event
23	B	84.5	K	PR	Determine a value by using two relationships shown on a graph, one being a line and the other being a broken-line
24	D	56.4	S	PR	Extrapolate by extending a pattern using information presented in a non-linear graph
25	C	64.9	K	SS	Identify the coordinates of a point on a grid
26	B	78.9	K	N	Find the number that represents a given percent of another number shown pictorially
27	A	76.8	S	SS	Use horizontal and vertical components on a grid to describe a translation from a real world context
28	C	82.7	K	N	Find the unit cost, in dollars, of an item when given the total cost for a set of items, in dollars
29	D	63.7	K	SP	Determine the number of possible combinations, given information organized in a chart
30	C	69.1	S	N	Solve a multi-step money problem involving multiplication, addition, and subtraction of whole numbers and decimals
31	B	49.1	S	PR	Identify an expression that can be used to extend a pictorial pattern
32	B	67.6	K	N	Determine the mixed number represented pictorially
33	C	70.6	S	PR	Extend a pattern to identify a numerical expression that is represented pictorially and numerically
34	B	54.8	S	PR	Determine the number of objects needed to extend a visual pattern
35	A	44.0	S	N	Solve a problem involving the multiplication and division of whole numbers and decimals
36	B	71.9	S	SS	Determine the length of one side of an equilateral triangle when the perimeter is given
37	D	72.1	K	SS	Identify the 3-D object that corresponds to a given net
38	A	52.6	S	SS	Find the total capacity of a set of containers that are measured in millilitres and litres
39	B	51.3	S	SS	Apply the relationship between litres and millilitres, and use multiplication and division to solve a problem
40	A	83.0	K	N	Identify the number words for a numeral that is given to hundred millions
41	B	49.9	S	SS	Find the surface area of a given net of an open rectangular solid that has no lid
42	B	69.1	S	N	Calculate the total value of various coins contained within a savings jar
43	D	60.3	S	N	Determine a fraction that represents part of a whole and then identify the equivalent form of the fraction
44	C	71.8	S	PR	Determine the rule to describe a relationship, and use it to extend a pattern

Question	Key	Diff. %	Reporting Category	Curricular Content Area (Concept)	Item Description
47	D	61.9	K	N	Find the unit cost, in cents, given the total cost in dollars
49	C	71.5	K	SP	Use information in a bar graph to solve a problem involving subtraction
50	D	77.2	K	SP	Interpret a bar graph to make a comparison

2006 Achievement Test

The questions presented in this document are from previously secured questions that appeared on the Part A and Part B Grade 6 Mathematics Achievement Test in 2006. These questions are released by Alberta Education.

Grade 6 Mathematics Achievement Test

2006

Part A

1. The sum of 38 178 and 16 729 is

A. 54 907
B. 54 897
C. 22 651
D. 21 449

2. If 8 is the greatest common factor of 24 and another number, then that other number could be

A. 16
B. 12
C. 4
D. 2

3. What is 203.4 ÷ 6?

A. 3 390
B. 339
C. 33.9
D. 3.39

4. What is the difference between 784.15 and 395?

A. 329.15
B. 389.15
C. 391.15
D. 411.15

5. What is 103.4 + 27.6 + 0.39?

A. 131.39
B. 141.39
C. 1 239
D. 1 349

6. What is 753 ÷ 3?

A. 2 510
B. 251
C. 25.1
D. 2.51

7. What is the product of 4 and 12?

A. 3
B. 8
C. 16
D. 48

8. A mixed fraction that is equivalent to $\frac{23}{5}$ is

A. $2\frac{3}{5}$

B. $4\frac{2}{5}$

C. $4\frac{3}{5}$

D. $5\frac{2}{5}$

9. A cake is cut into 20 equal pieces. If 60% of the cake is eaten, then how many pieces are eaten?

A. 3
B. 8
C. 12
D. 16

10. The factors of 8 are

A. 1, 2, 4, and 8
B. 2, 4, 6, and 8
C. 2, 4, 8, and 16
D. 4, 8, 12, and 16

11. How many 25¢ coins does it take to make $11.75?

A. 57
B. 52
C. 47
D. 43

12. A student pays for an item with a $20.00 bill. If his change is $4.75, then how much did the item cost?

A. $14.25
B. $15.25
C. $15.75
D. $24.75

13. Which of the following numbers has no remainder when divided by 3?

- **A.** 518
- **B.** 515
- **C.** 427
- **D.** 426

14. The sum of three numbers is 98. If the first two numbers are 35 and 45, then what is the third number?

- **A.** 178
- **B.** 80
- **C.** 18
- **D.** 10

15. What is 264.08 ÷ 2?

- **A.** 13 204
- **B.** 13 240
- **C.** 132.04
- **D.** 132.40

16. If Kelly has 6 dozen eggs, then how many eggs does Kelly have?

- **A.** 96
- **B.** 84
- **C.** 72
- **D.** 66

17. The percentage that is equivalent to $\frac{1}{5}$ is

A. 5%
B. 10%
C. 15%
D. 20%

18. What is 60×12?

A. 720
B. 620
C. 72
D. 62

19. What is 28 764 – 9 786?

A. 18 022
B. 18 978
C. 19 022
D. 19 978

20. The ratio 20:4 is equivalent to

A. 4 to 24
B. 24 to 4
C. 1 to 5
D. 5 to 1

21. Darsh returned a book 6 days late. He was charged $1.25 for each day that the book was late. What was the total late charge?

A. $7.25
B. $7.50
C. $8.25
D. $8.50

22. The expression that equals 354.79 is

A. 554.59 – 198.80
B. 554.29 – 208.90
C. 199.20 + 154.59
D. 194.59 + 160.20

23. What number divides 83 four times and leaves a remainder of 3?

A. 10
B. 20
C. 30
D. 40

24. If 4 750 mL of water is required to fill a 5 L container, then how much water was in the container to begin with?

A. 4 755 mL
B. 4 745 mL
C. 750 mL
D. 250 mL

25. The number 345.184, rounded to the nearest tenth, is

A. 350
B. 345.2
C. 345.18
D. 345.1

26. Another way to represent the sum of 323 + 45 + 6 is

A. 350 + 25 + 6
B. 300 + 70 + 4
C. 300 + 65 + 6
D. 250 + 90 + 4

27. If $\frac{15}{45} = \frac{3}{n}$, then n is equal to

A. 18
B. 15
C. 9
D. 5

28. If one pencil costs \$0.35, then the cost of 20 pencils is

A. \$7.70
B. \$7.50
C. \$7.00
D. \$6.00

29. If Zoe eats $\frac{3}{9}$ of a pizza, then how much of the pizza has she eaten?

A. $\frac{1}{3}$

B. $\frac{2}{3}$

C. $\frac{2}{9}$

D. $\frac{7}{9}$

30. Another way to write (3 × 10 000) + (4 × 100) + (2 × 1 000 000) + (7 × 10) + (5 × 1 000) is

A. 23 547

B. 34 275

C. 2 035 407

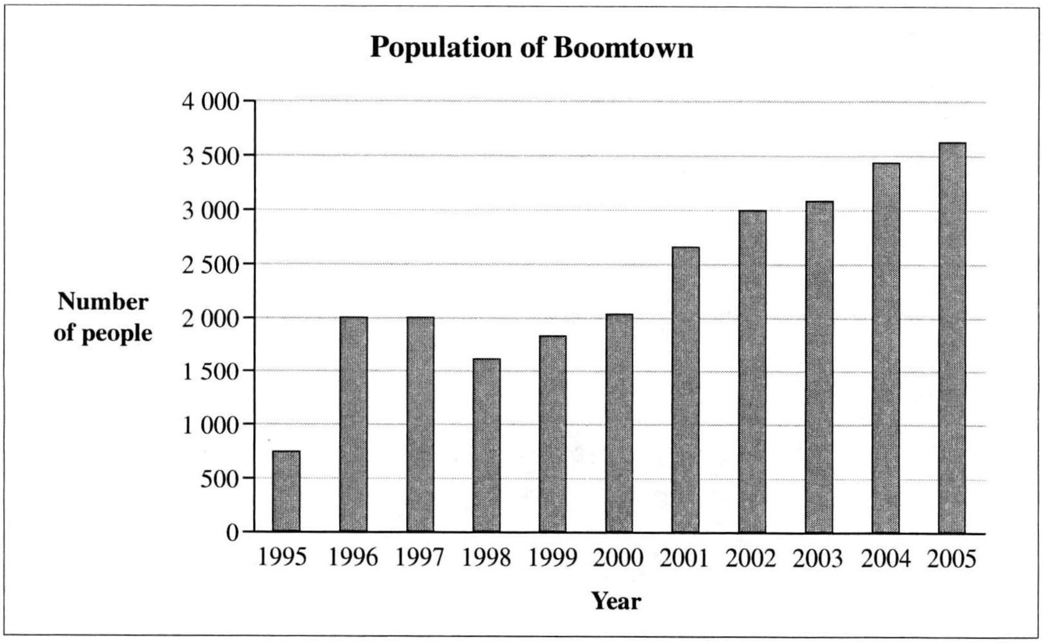
D. 2 035 470

Grade 6 Mathematics Achievement Test

2006

Part B

Use the following graph to answer questions 1 and 2.



1. How many more people lived in Boomtown in 2002 than in 1997?

A. 1 000
B. 2 000
C. 3 000
D. 5 000

2. The greatest population increase in Boomtown occurred between the years

A. 2004 and 2005
B. 2003 and 2004
C. 2000 and 2001
D. 1995 and 1996

3. The Boomtown town council wants to determine if the citizens want a new soccer field. To obtain an unbiased sample of citizens, the town council should

A. survey players on a Boomtown soccer team
B. interview coaches from Boomtown sports teams
C. place a questionnaire in the local Boomtown newspaper
D. conduct a random telephone survey of Boomtown residents

Use the following information to answer question 4.

Each tire on a large mining vehicle costs approximately $53 000.

4. If each mining vehicle has 6 tires, then the total cost of tires for 10 mining vehicles is approximately

A. $3 000 000
B. $2 000 000
C. $300 000
D. $500 000

Use the following information to answer question 5.

The science centre is open every day in April. Anne and Jack are tour guides at the science centre. Anne works every second day. Jack works every third day.

April Work Schedule

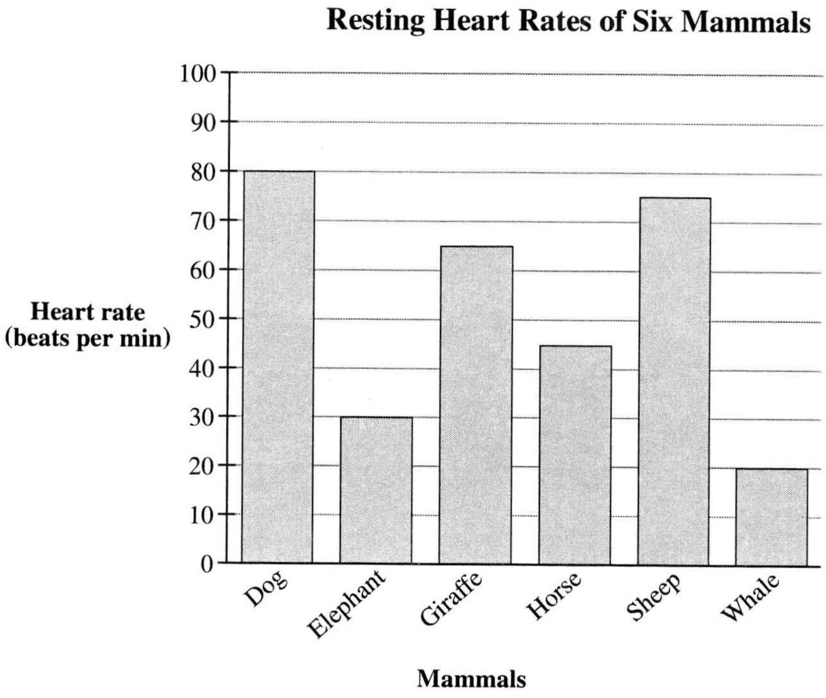
Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2 Anne Jack	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

5. If Anne and Jack both start work on April 2, then how many more days will Anne work than Jack in the month of April?

A. 3
B. 4
C. 5
D. 6

Use the following information to answer questions 6 and 7.

The following graph displays the average resting heart rates of six mammals.



6. Which mammal has a resting heart rate that is about $\frac{1}{3}$ the resting heart rate of a giraffe?

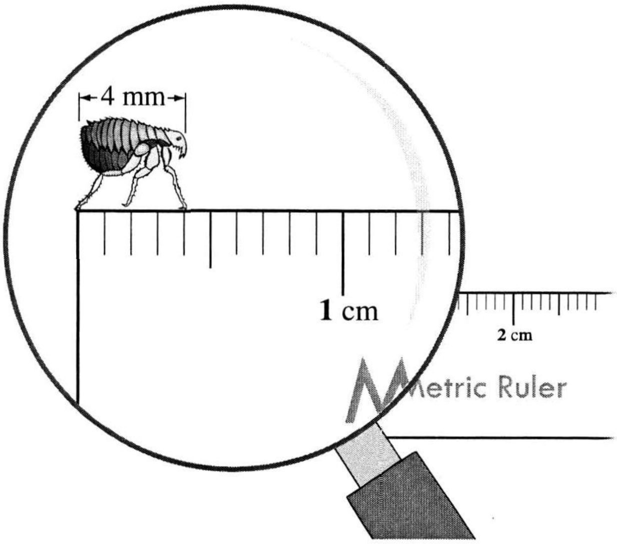
A. Dog
B. Elephant
C. Horse
D. Whale

7. Which of the following expressions could be used to calculate how many times an elephant's heart beats in 3 hours while at rest?

A. $180 \times 30 \times 3$
B. $180 \times 30 \div 3$
C. $60 \times 30 \times 3$
D. $60 \times 30 \div 3$

Use the following information to answer question 8.

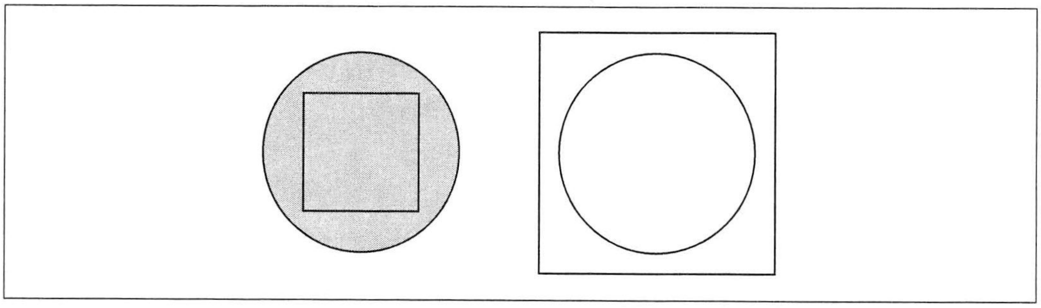
The length of a flea is represented below.



8. If the flea can jump 8 cm, then how many times its own body length can it jump?

A. 20
B. 32
C. 200
D. 320

Use the following diagram to answer question 9.

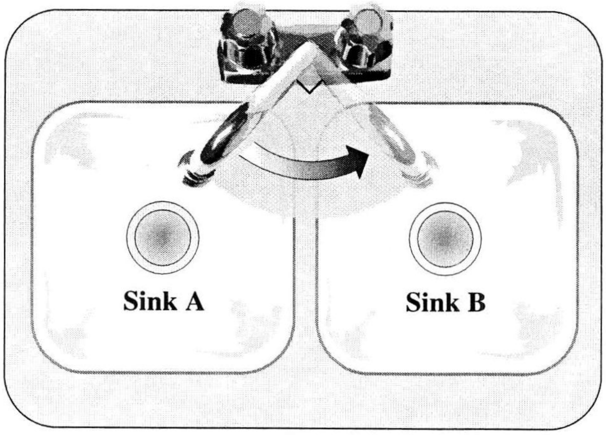


9. The purpose of the optical illusion is to make it appear that the

A. grey square is congruent to the white square
B. white circle is congruent to the grey circle
C. grey square is larger than the white circle
D. white circle is larger than the grey circle

Use the following information to answer question 10.

A waterspout moves from sink A to sink B, as shown below.

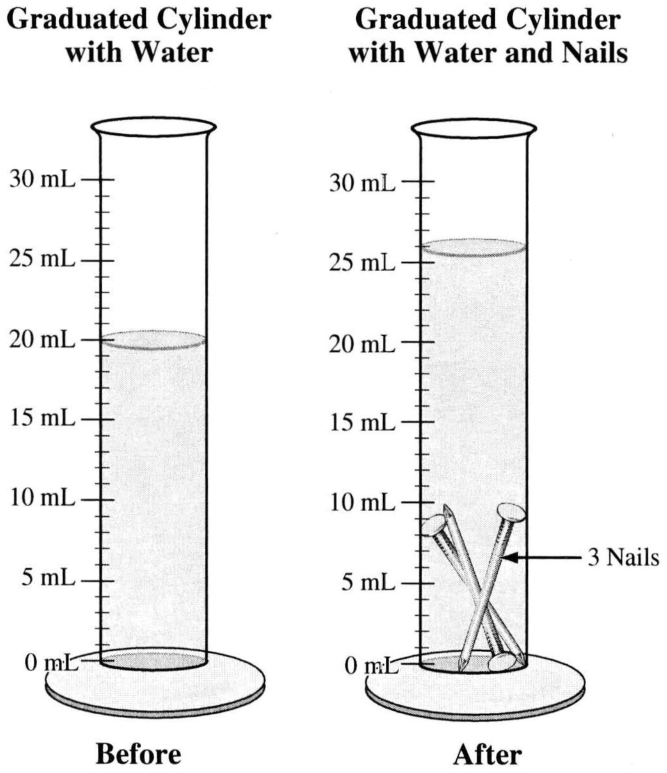


10. The movement of the waterspout from sink A to sink B represents a

A. 180° counter-clockwise turn
B. 90° counter-clockwise turn
C. 180° clockwise turn
D. 90° clockwise turn

Use the following information to answer question 11.

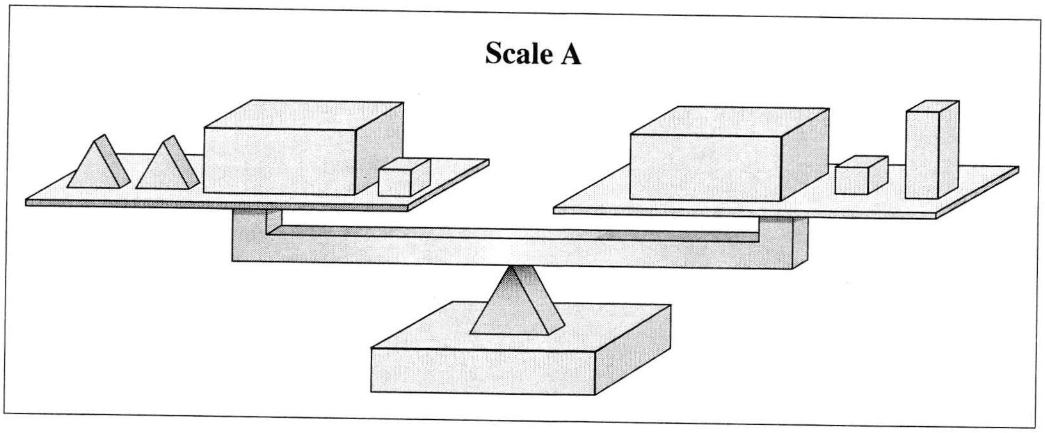
The volume of an object can be determined using water displacement.



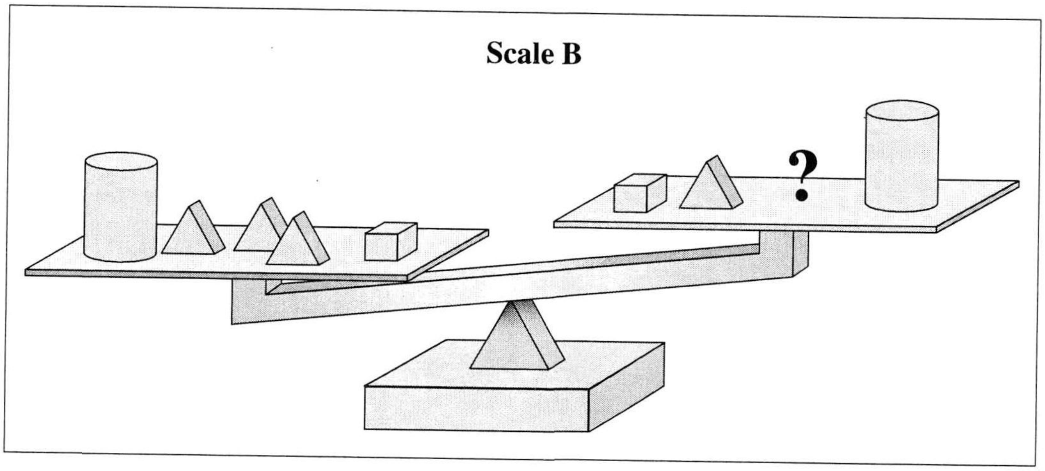
11. The volume of 1 nail is

A. 26 cm^3
B. 18 cm^3
C. 6 cm^3
D. 2 cm^3

Use the following diagrams to answer question 12.



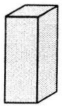
Scale A



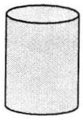
Scale B

12. Which object is needed to balance Scale B?

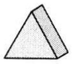
A.



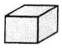
B.



C.



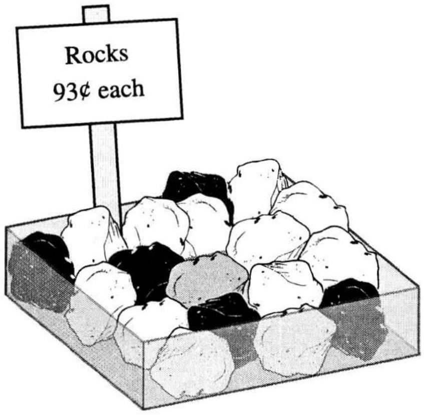
D.



13. **Item not released**

Use the following information to answer question 14.

The gift store at a science centre sells souvenir rocks.



14. If Twila buys 12 souvenir rocks and pays the cashier with $20.00, then how many more souvenir rocks can she buy with her change?

A. 8
B. 9
C. 10
D. 11

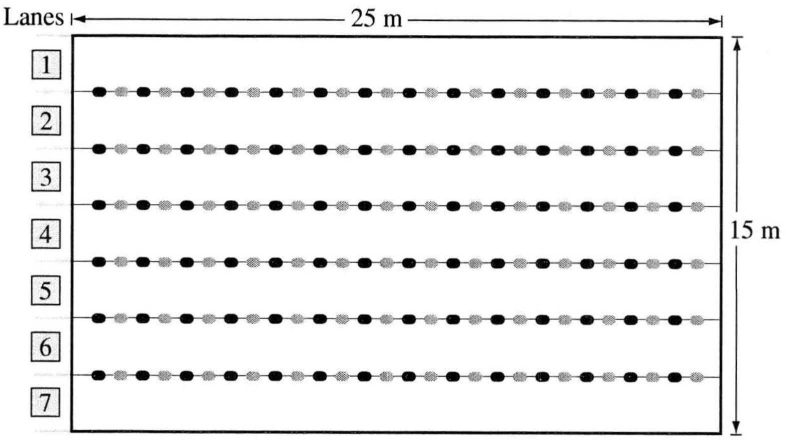
---

15. The outside air temperature at 3:00 P.M. is 22.5 °C. If the temperature drops by 1.5 °C every hour after that, then at what time will the temperature be 15 °C?

A. 8:00 P.M.
B. 8:30 P.M.
C. 9:00 P.M.
D. 9:30 P.M.

Use the following information to answer questions 16 and 17.

A swimming pool is 25 m long and 15 m wide.



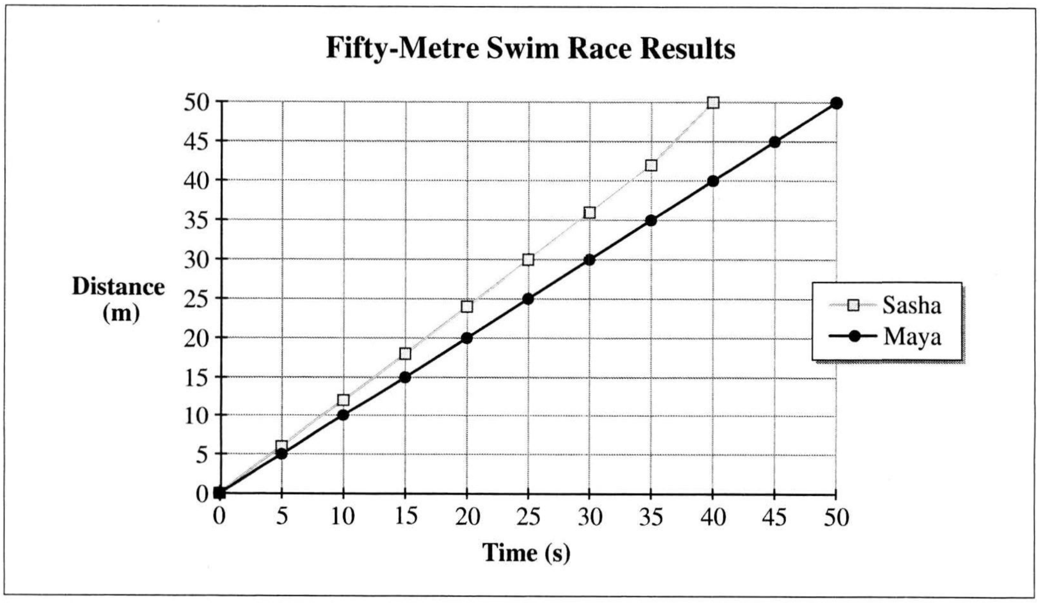
16. The ratio of the length of the pool to the width of the pool is

A. 3:8
B. 8:3
C. 3:5
D. 5:3

17. If there is 1 person swimming in each lane, and each person swims 4 lengths, then the total distance that all of these people will swim is

A. 100 m
B. 400 m
C. 600 m
D. 700 m

Use the following graph to answer question 18.



18. How many metres was Maya from the finish line when Sasha completed the race?

A. 5 m

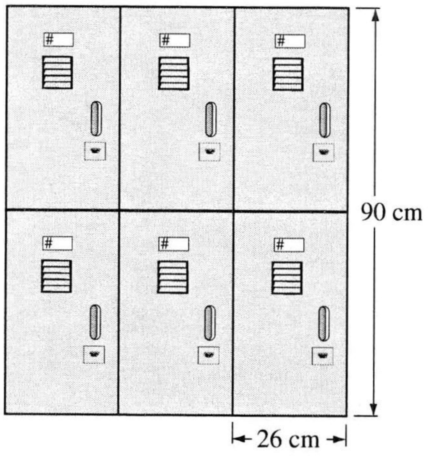
B. 10 m

C. 40 m

D. 50 m

Use the following information to answer question 19.

Six congruent storage lockers are shown below.



19. The area of **one** locker door is

A. 71 cm^2
B. 142 cm^2
C. 1 170 cm^2
D. 2 340 cm^2

---

20. What are the dimensions of a rectangular room that has a perimeter of 48 m and an area of 128 m^2?

A. 14 m long and 10 m wide
B. 15 m long and 9 m wide
C. 16 m long and 8 m wide
D. 17 m long and 7 m wide

21. Joey has 10 hockey cards and 20 baseball cards in his knapsack. If Joey takes a card from his knapsack without looking, then what is the probability that it will be a baseball card?

A. $\frac{2}{3}$

B. $\frac{1}{2}$

C. $\frac{1}{20}$

D. $\frac{1}{30}$

Use the following information to answer question 22.

The following chart shows the total number of minutes that a particular person walks over 5 weeks.

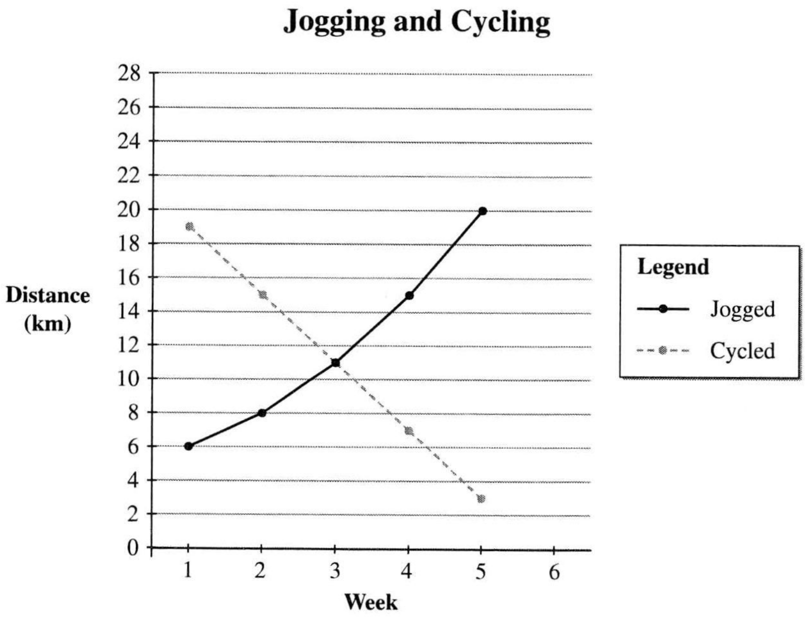
Week	1	2	3	4	5	6	7
Minutes	10	12	16	24	40	?	?

22. If the pattern above continues, then the number of minutes the person will walk in week 7 is

A. 72
B. 64
C. 136
D. 144

Use the following information to answer questions 23 and 24.

The following graph shows the distance that a particular person jogged and cycled each week for 5 weeks.



23. According to the graph, in which week was the jogging distance equal to the cycling distance?

A. 1

B. 3

C. 4

D. 5

24. If the pattern on the graph for jogging continues, then the total distance that the person will jog in week 6 is

A. 5 km

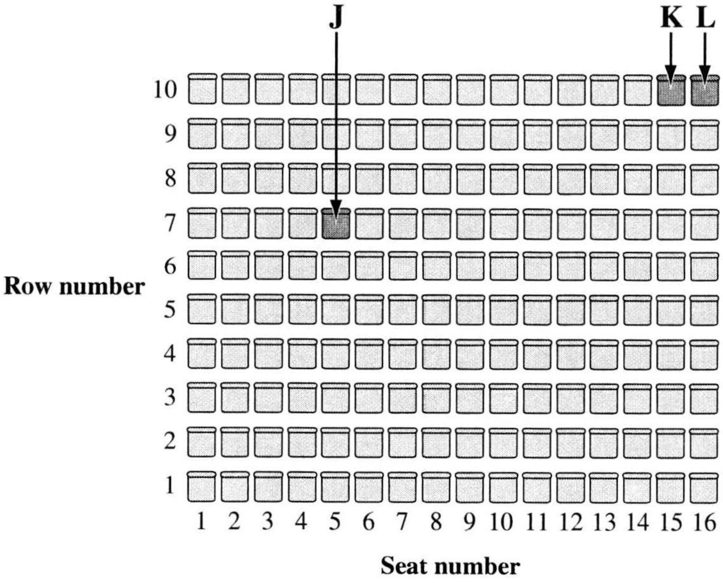
B. 6 km

C. 25 km

D. 26 km

Use the following information to answer questions 25 to 27.

The seats in a particular section of a sports centre are represented on a coordinate grid, as shown below. Three of the seats have been labelled.



25. The ordered pair representing the seat labelled K is

A. (10, 15)
B. (10, 16)
C. (15, 10)
D. (16, 10)

26. If 50% of the seats in this section are occupied, then the total number of occupied seats in this section is

A. 40
B. 80
C. 160
D. 320

27. Which of the following directions tells how to get from seat J to seat L?

A. 11 seats right and 3 seats up
B. 11 seats right and 4 seats up
C. 12 seats right and 3 seats up
D. 12 seats right and 4 seats up

---

28. Sally buys 5 concert tickets for a total cost of $626.50. If each ticket costs the same amount, then what is the cost of one ticket?

A. $89.50
B. $125.10
C. $125.30
D. $3 132.50

Use the following information to answer question 29.

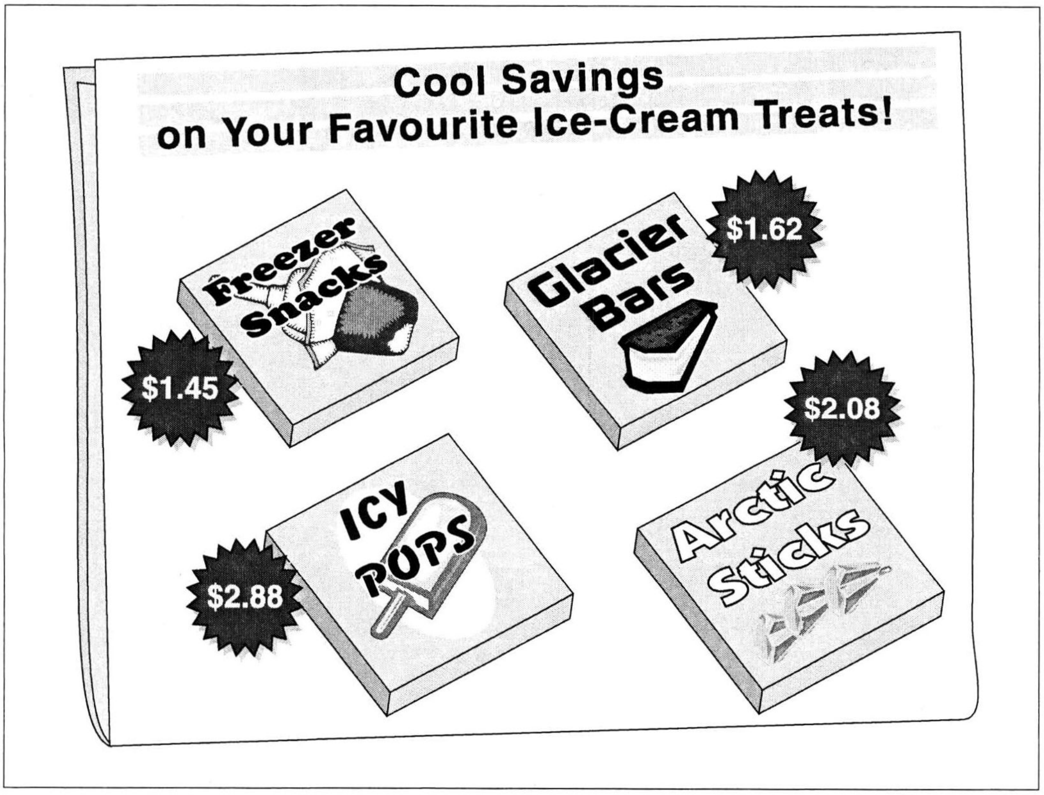
The following chart shows the crust choices, vegetable toppings, and meat toppings available for pizza at a concession stand.

Crust	**Vegetable**	**Meat**
Regular	Onions	Chicken
Thin	Olives	Beef
Thick	Tomatoes	Bacon

29. How many different types of pizzas can be made using 1 crust, 1 vegetable topping, and 1 meat topping?

A. 3
B. 9
C. 12
D. 27

Use the following illustration to answer question 30.

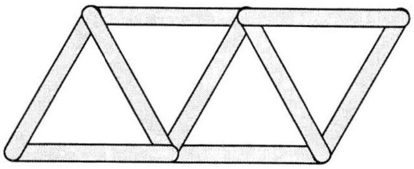


30. To purchase some ice-cream treats, 23 students give $1.50 each. How much money will be left over if the students purchase 3 boxes of Icy Pops, 2 boxes of Glacier Bars, and 1 box of Freezer Snacks?

- **A.** $34.50
- **B.** $28.55
- **C.** $21.17
- **D.** $13.33

Use the following information to answer question 31.

Pierre arranges ice-cream sticks to form the pattern shown below.



31. An expression that can be used to determine the total number of ice-cream sticks that Pierre will need to continue the pattern is

A. Number of triangles × 2 – 1

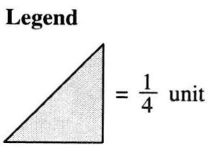
B. Number of triangles × 2 + 1

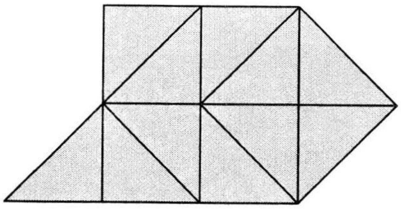
C. Number of triangles × 3 – 2

D. Number of triangles × 3 + 2

Use the following information to answer question 32.

Determine the total unit value of the shape shown below.





32. The total unit value of the shape is

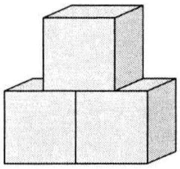
A. 5 units

B. $2\frac{3}{4}$ units

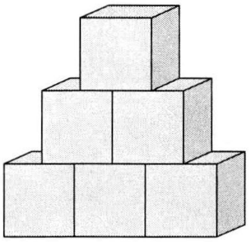
C. $2\frac{1}{4}$ units

D. $\frac{4}{11}$ unit

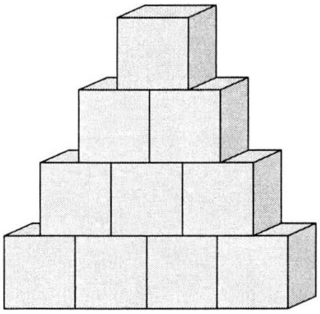
Use the following information to answer question 33.



Structure **1**



Structure **2**



Structure **3**

Structure	1	2	3	4	5
Number of Blocks	3	6	10	?	?

33. Which of the following expressions represents the number of blocks that are needed for structure 5?

A. 10 + 5

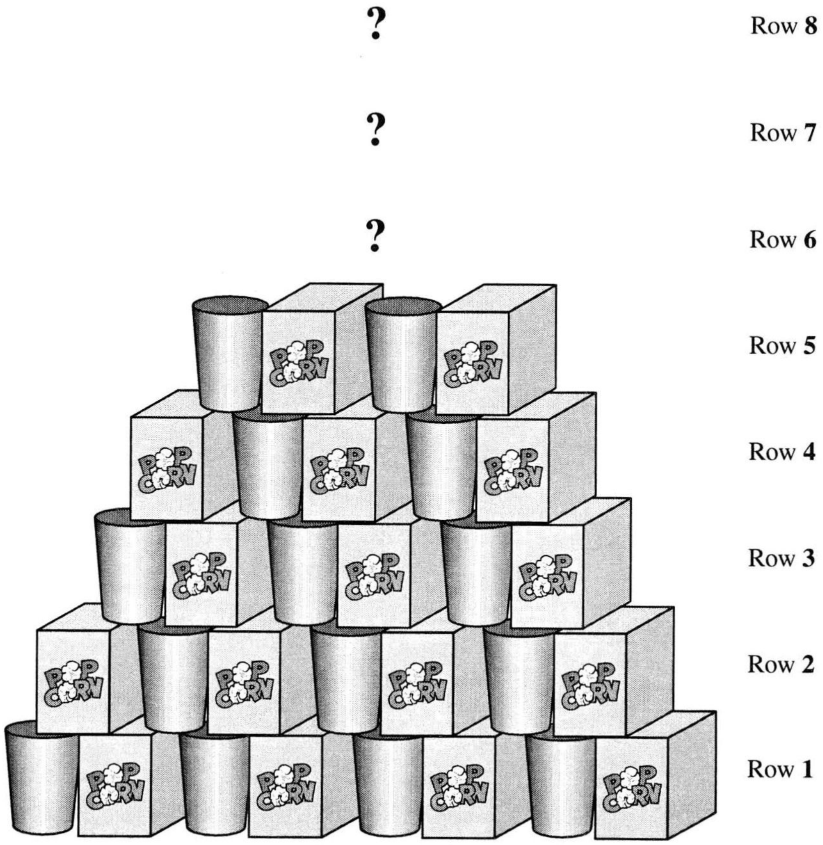
B. 10 + 6

C. 15 + 6

D. 15 + 7

Use the following information to answer question 34.

Behind the counter at a movie theatre, a display using popcorn boxes and drink cups is being built, as shown below.

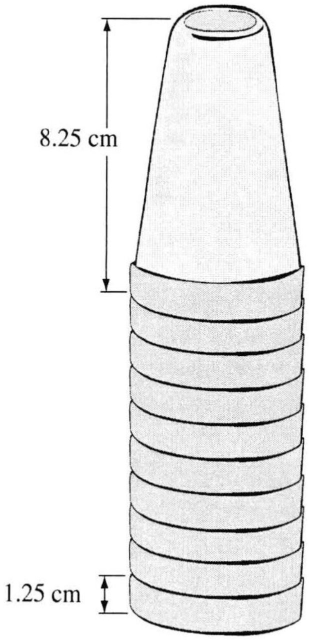


34. If the pattern is continued to complete the display, then the total number of **drink cups** used in all 8 rows will be

A. 14
B. 16
C. 18
D. 36

Use the following information to answer question 35.

A stack of 10 cups is shown below. The height of each cup is 8.25 cm, and the height of the rim of each cup is 1.25 cm.

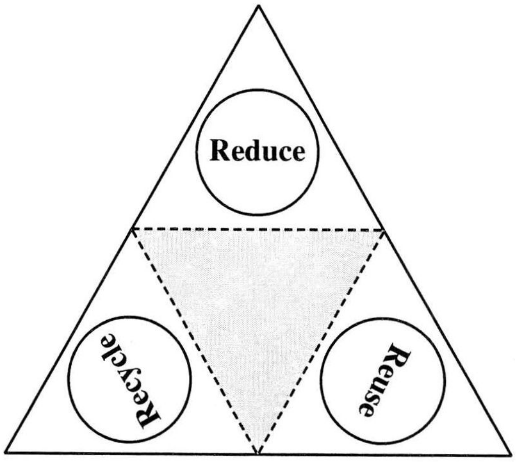


35. The total height of the stack of 10 cups is

- **A.** 19.50 cm
- **B.** 20.75 cm
- **C.** 82.50 cm
- **D.** 83.75 cm

Use the following diagram to answer questions 36 and 37.

Net of 3-D Display



36. If the perimeter of the shaded equilateral triangle indicated on the net is 42 cm, then the lengths of its sides are

- **A.** 13 cm, 13 cm, 16 cm
- **B.** 14 cm, 14 cm, 14 cm
- **C.** 15 cm, 15 cm, 12 cm
- **D.** 16 cm, 16 cm, 16 cm

37. Which 3-D object will be formed from the net shown above?

- **A.** A square prism
- **B.** A square pyramid
- **C.** A triangular prism
- **D.** A triangular pyramid

Use the following information to answer questions 38 and 39.

Students collected the following empty containers.

Size/Type of Container	**Number Collected**
250 mL juice boxes	23
355 mL pop cans	18
1 L juice bottles	4
2 L pop bottles	6

38. What is the total capacity of all the empty containers that were collected?

A. 28 140 mL
B. 25 140 mL
C. 13 406 mL
D. 12 156 mL

Use the following additional information to answer question 39.

A recycling depot gives refunds for containers as shown below.

Container Size	**Refund**
Less than 1 litre	5 cents
1 litre or more	20 cents

39. The total refund for all the containers collected by the students is

A. $2.55
B. $4.05
C. $10.20
D. $22.50

40. The number of aluminum pop cans recycled in a city in one year was 368 483 928. Which of the following phrases shows this number written in words?

A. Three hundred sixty-eight million four hundred eighty-three thousand nine hundred twenty-eight

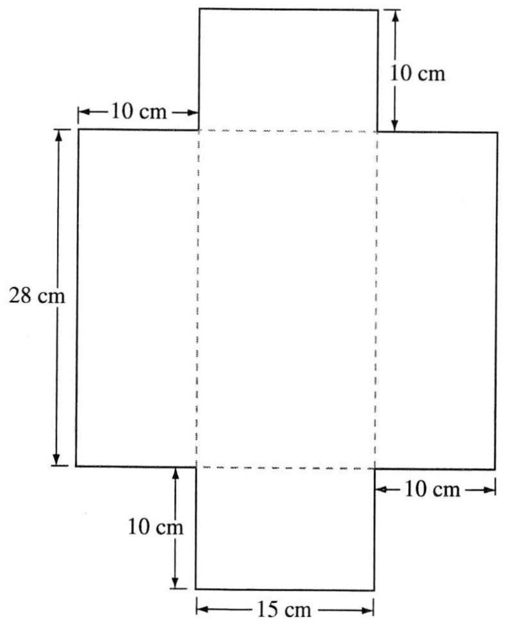
B. Three hundred sixty-eight million four hundred thirty-eight thousand nine hundred twenty-eight

C. Three billion sixty-eight million four hundred eighty-three thousand nine hundred twenty-eight

D. Three hundred sixty-eight billion four hundred thirty-eight thousand nine hundred twenty-eight

Use the following information to answer question 41.

The net of a juice box case and its dimensions are shown below.



41. The total area of the net is

A. 2 160 cm^2

B. 1 280 cm^2

C. 860 cm^2

D. 850 cm^2

Use the following table to answer questions 42 and 43.

Coins in a Savings Jar

Coin	Number
1¢	16
5¢	5
10¢	10
25¢	3
$1	4
$2	2

42. According to the table, how much money is in the savings jar?

A. $8.16
B. $10.16
C. $10.41
D. $12.41

43. What fraction represents the total number of coins in the savings jar that are pennies?

A. $\frac{5}{2}$

B. $\frac{3}{2}$

C. $\frac{2}{3}$

D. $\frac{2}{5}$

Use the following information to answer question 44.

Some coins are placed in rows. The number of coins in each row is recorded in the following chart.

Row Number	**Number of Coins**
1	4
2	8
3	12
4	16
↓	↓
20	?

44. If the pattern on the chart continues, then which of the following equations can be used to represent the number of coins for row 20?

A. $20 + 4 = 24$

B. $20 + 16 = 36$

C. $20 \times 4 = 80$

D. $20 \times 20 = 400$

45. **Item not released.**

46. **Item not released.**

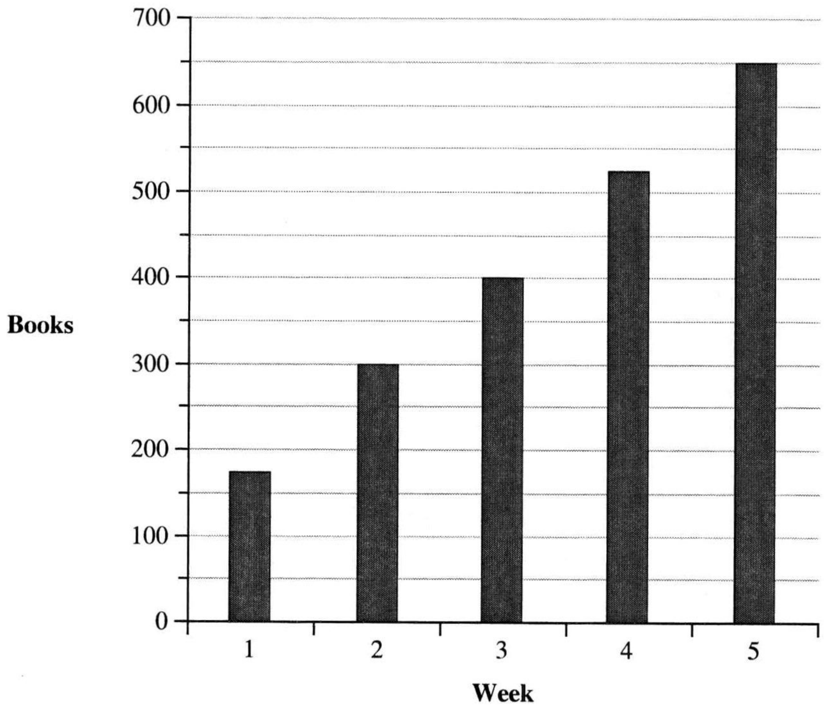
47. A package of blank CDs costs $6.00. If each package contains 15 CDs, then the cost of 1 CD is

A. 15¢
B. 20¢
C. 25¢
D. 40¢

48. **Item not released.**

Use the following information to answer question 49.

A graph displayed in a library shows the number of books read by students each week.



Books Read by Students

49. According to the graph, the difference between the number of books read by students in week 5 and the number of books read by students in week 1 is

A. 125

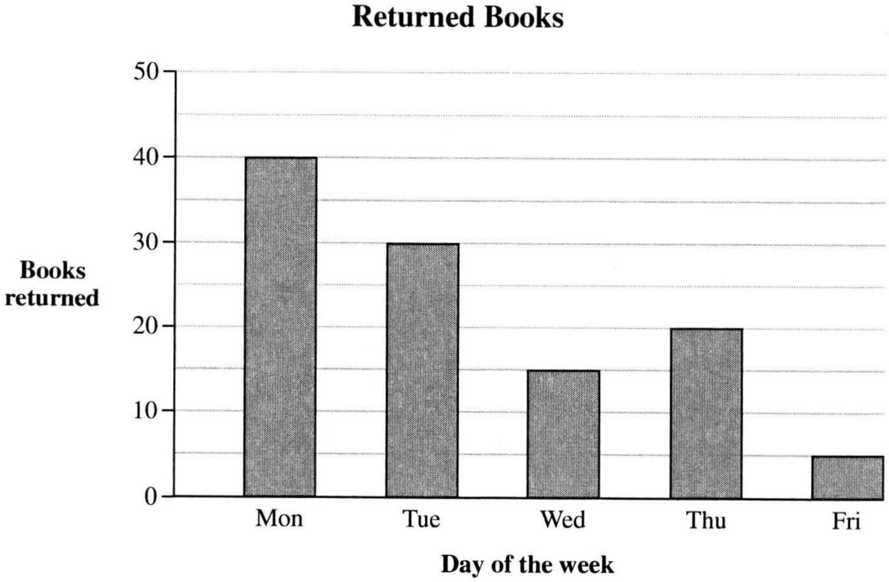
B. 375

C. 475

D. 525

Use the following information to answer question 50.

The librarian displays a graph representing the number of library books that were returned each day in a particular week.



50. According to the graph, on which day were there exactly 4 times as many books returned as there were on Friday?

A. Monday
B. Tuesday
C. Wednesday
D. Thursday